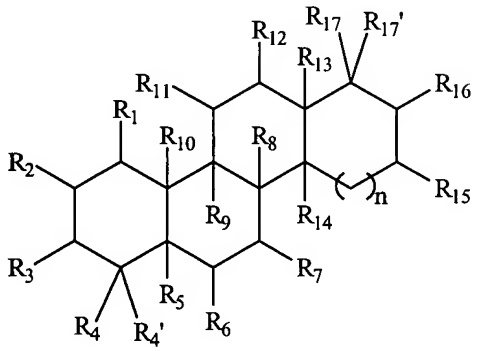
Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A compound of formula (1):



(1)

wherein

each of R_1, R_2, R_7, R_{11}, R_{12}, R_{15}, and R_{16}, independently, is hydrogen, hydroxy, amino, carboxyl, oxo, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, -SO_2-, -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_4 is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, -SO_2-, -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO- , and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid; or R_4 together with $R_{4'}$ is oxo;

$R_{4'}$ is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, -SO_2-, -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -

N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid; or $R_{4'}$ together with R_4 is oxo;

each of R_{17}, and $R_{17'}$, independently, is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_3 is X-Y-, wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-;

R_5 and R_6, together, are -O-; or R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo;

each of R_8, R_9, R_{10}, R_{13}, and R_{14}, independently, is hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxy, hydroxy, or amino; ~~and~~

n is 0, 1, or 2~~.~~; and provided that when R^1, R^2, R^4, $R^{4'}$, R^8, R^9, R^{11}, R^{12}, R^{14}, R^{15}, R^{16}, and R^{17} are hydrogen; R^{10} and R^{13} are CH_3; R^5 and R^6 together are a double bond between C-5 and C-6; R^7 is hydrogen or oxo; $R^{17'}$ is $CH_3CH(CH_2)_3CH(CH_3)_2$; and n is 0, then R^3 is $(CH_3CH_2)_3HN^{(+)\,(-)}OSO_2O-$ or X-Y- wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, -CO-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

2. (Original) The compound of claim 1, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

3. (Withdrawn) The compound of claim 1, wherein R_5 and R_6, together, are -O-.

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4. (Withdrawn) The compound of claim 3, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

5. (Withdrawn) The compound of claim 4, wherein X is hydrogen, and Y is $-SO_3$.

6. (Withdrawn) The compound of claim 3, wherein -O- is on the α side of C-5 and C-6.

7. (Withdrawn) The compound of claim 6, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

8. (Withdrawn) The compound of claim 7, wherein X is hydrogen, and Y is $-SO_3$.

9. (Withdrawn) The compound of claim 8, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen; and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

10. (Withdrawn) The compound of claim 9, wherein the compound is 5α, 6α-epoxycholesterol-3-sulfate.

11. (Withdrawn) An antibody which is specifically against the compound of claim 10.

12. (Original) The compound of claim 1, wherein R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo.

13. (Original) The compound of claim 12, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

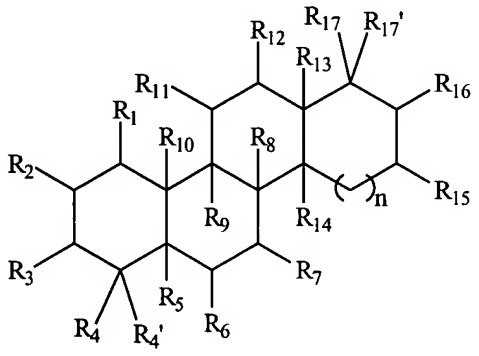
14. (Original) The compound of claim 13, wherein X is hydrogen, and Y is $-SO_3-O-$.

15. (Original) The compound of claim 14, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen; and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

16. (Cancelled)

17. (Withdrawn) An antibody which is specifically against the compound of claim 16.

18. (Withdrawn) A method of treating hypocholesterolemia, comprising administering to a subject in need thereof an effective amount of a compound of formula (1):



(1)

wherein

each of R_1, R_2, R_4, $R_{4'}$, R_7, R_{11}, R_{12}, R_{15}, R_{16}, R_{17}, and $R_{17'}$, independently, is hydrogen, hydroxy, amino, carboxyl, oxo, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -O-, -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_3 is X-Y-, wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-;

R_5 and R_6, together, are -O-; or R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo;

each of R_8, R_9, R_{10}, R_{13}, and R_{14}, independently, is hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxy, hydroxy, or amino; and

n is 0, 1, or 2.

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19. (Withdrawn) The method of claim 18, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

20. (Withdrawn) The method of claim 18, wherein R_5 and R_6, together, are -O-.

21. (Withdrawn) The method of claim 20, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

22. (Withdrawn) The method of claim 21, wherein X is hydrogen, and Y is -SO_3-O-.

23. (Withdrawn) The method of claim 20, wherein -O- is on the α side of C-5 and C-6.

24. (Withdrawn) The method of claim 23, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO.

25. (Withdrawn) The method of claim 24, wherein X is hydrogen, and Y is -SO_3-O-.

26. (Withdrawn) The method of claim 25, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

27. (Withdrawn) The method of claim 26, wherein the compound is 5α, 6α-epoxycholesterol-3-sulfate.

28. (Withdrawn) The method of claim 18, wherein R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo.

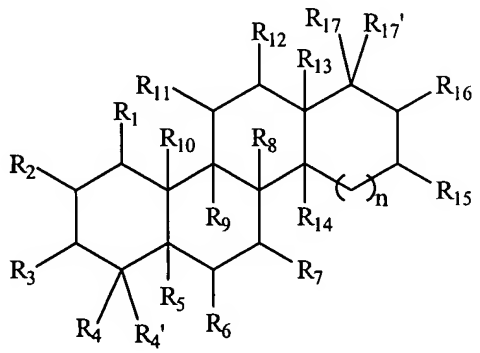
29. (Withdrawn) The method of claim 28, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

30. (Withdrawn) The method of claim 29, wherein X is hydrogen, and Y is -SO_3-O-.

31. (Withdrawn) The method of claim 30, wherein R_1, R_2, R_4, R_4', R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and R_{17}', independently, is alkyl.

32. (Withdrawn) The method of claim 31, wherein the compound is 7-keto-cholesterol-3-sulfate.

33. (Currently amended) A pharmaceutical composition comprising a compound of formula (1):



(1)

wherein:

each of R_1, R_2, R_7, R_{11}, R_{12}, R_{15}, and R_{16}, independently, is hydrogen, hydroxy, amino, carboxyl, oxo, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, -SO_2-, -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_4 is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid; or R_4 together with $R_{4'}$ is oxo;

$R_{4'}$ is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid; or $R_{4'}$ together with R_4 is oxo;

each of R_{17}, and $R_{17'}$, independently, is hydrogen, hydroxy, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -NH-, -N(alkyl)-, -O-, -S-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_3 is X-Y-, wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-;

R_5 and R_6, together, are -O-; or R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo;

each of R_8, R_9, R_{10}, R_{13}, and R_{14}, independently, is hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxy, hydroxy, or amino; ~~and~~

n is 0, 1, or 2; provided that when R^1, R^2, R^4, $R^{4'}$, R^8, R^9, R^{11}, R^{12}, R^{14}, R^{15}, R^{16}, and R^{17} are hydrogen; R^{10} and R^{13} are CH_3; R^5 and R^6 together are a double bond between C-5 and C-6; R^7 is hydrogen or oxo; $R^{17'}$ is $CH_3CH(CH_2)_3CH(CH_3)_2$; and n is 0, then R^3 is $(CH_3CH_2)_3HN^{(+)}\ ^{(-)}OSO_2O-$ or X-Y- wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, -CO-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-;

and a pharmaceutically acceptable carrier.

34. (Original) The composition of claim 33, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

35. (Withdrawn) The composition of claim 33, wherein R_5 and R_6, together, are -O-.

36. (Withdrawn) The composition of claim 35, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

37. (Withdrawn) The composition of claim 36, wherein X is hydrogen, and Y is –SO_3-O-.

38. (Withdrawn) The composition of claim 35, wherein -O- is on the α side of C-5 and C-6.

39. (Withdrawn) The composition of claim 38, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

40. (Withdrawn) The composition of claim 39, wherein X is hydrogen, and Y is -SO_3-O-.

41. (Withdrawn) The composition of claim 40, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

42. (Withdrawn) The composition of claim 41, wherein the compound is 5α, 6α-epoxycholesterol-3-sulfate.

43. (Original) The composition of claim 33, wherein R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo.

44. (Original) The composition of claim 33, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

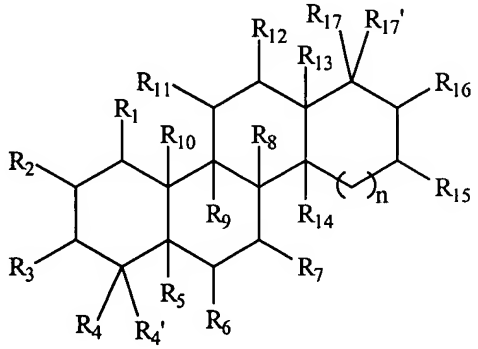
45. (Original) The composition of claim 44, wherein X is hydrogen, and Y is -SO_3-O-.

46. (Original) The composition of claim 45, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

47. (Cancelled)

48. (Withdrawn) A method of evaluating a compound for its agonistic effect on an liver X receptor, comprising:

contacting the compound to be evaluated with the liver X receptor in the presence of a compound of formula (1):



(1)

wherein

each of R_1, R_2, R_4, $R_{4'}$, R_7, R_{11}, R_{12}, R_{15}, R_{16}, R_{17}, and $R_{17'}$, independently, is hydrogen, hydroxy, amino, carboxyl, oxo, halo, sulfonic acid, -O-sulfonic acid, or alkyl that is optionally inserted with -O-, -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-, and further optionally substituted with hydroxy, halo, amino, carboxyl, sulfonic acid, or -O-sulfonic acid;

R_3 is X-Y-, wherein X is hydrogen, amino, carboxyl, halo, sulfonic acid, -O-sulfonic acid, or alkyl; Y is -S-, -NH-, -N(alkyl)-, -SO-, $-SO_2-$, $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-;

R_5 and R_6, together, are -O-; or R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo;

each of R_8, R_9, R_{10}, R_{13}, and R_{14}, independently, is hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxy, hydroxy, or amino; and

n is 0, 1, or 2; and

assessing the agonistic effect of the compound to be evaluated on the liver X receptor.

49. (Withdrawn) The method of claim 48, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

50. (Withdrawn) The method of claim 48, wherein R_5 and R_6, together, are -O-.

51. (Withdrawn) The method of claim 50, wherein X is hydrogen or amino, and Y is $-O-SO_2-$, $-SO_2-O-$, $-SO_3-O-$, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

52. (Withdrawn) The method of claim 51, wherein X is hydrogen, and Y is $-SO_3-O-$.

53. (Withdrawn) The method of claim 50, wherein -O- is on the α side of C-5 and C-6.

54. (Withdrawn) The method of claim 51, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

55. (Withdrawn) The method of claim 54, wherein X is hydrogen, and Y is -SO_3-O-.

56. (Withdrawn) The method of claim 55, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

57. (Withdrawn) The method of claim 56, wherein the compound is 5α, 6α-epoxycholesterol-3-sulfate.

58. (Withdrawn) The method of claim 48, wherein R_5 and R_6, together, are a double bond between C-5 and C-6, and R_7 is oxo.

59. (Withdrawn) The method of claim 48, wherein X is hydrogen or amino, and Y is -O-SO_2-, -SO_2-O-, -SO_3-O-, -CO-, -CO-O-, -O-CO-, -CO-NH-, -CO-N(alkyl)-, -NH-CO-, or -N(alkyl)-CO-.

60. (Withdrawn) The method of claim 59, wherein X is hydrogen, and Y is -SO_3-O-.

61. (Withdrawn) The method of claim 60, wherein R_1, R_2, R_4, $R_{4'}$, R_7, R_8, R_9, R_{11}, R_{12}, R_{14}, R_{15}, R_{16}, and R_{17} are hydrogen, and each of R_{10}, R_{13}, and $R_{17'}$, independently, is alkyl.

62. (Withdrawn) The method of claim 61, wherein the compound is 7-keto-cholesterol-3-sulfate.